

(19)

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 1 382 498 A3

(12)

## EUROPEAN PATENT APPLICATION

(88) Date of publication A3:  
03.03.2004 Bulletin 2004/10

(51) Int Cl.7: B60R 22/46

(43) Date of publication A2:  
21.01.2004 Bulletin 2004/04

(21) Application number: 03015524.6

(22) Date of filing: 10.07.2003

(84) Designated Contracting States:  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR  
Designated Extension States:  
AL LT LV MK

- Komiya, Fuminori,  
Tokai-Rika-Denki-Seisakusho K.K.  
Niwa-gun, Aichi-ken (JP)
- Koide, Teruhiko,  
Tokai-Rika-Denki-Seisakusho K.K.  
Niwa-gun, Aichi-ken (JP)

(30) Priority: 11.07.2002 JP 2002202970

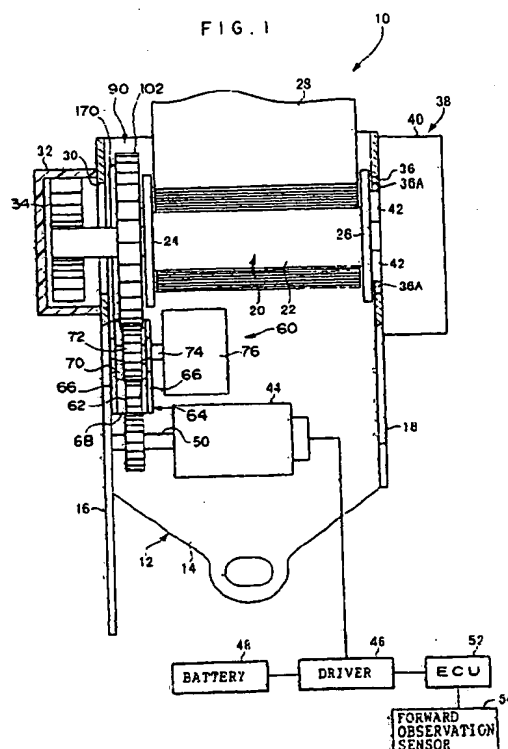
(71) Applicant: Kabushiki Kaisha  
Tokai-Rika-Denki-Seisakusho  
Niwa-gun, Aichi-ken 480-0195 (JP)

(74) Representative:  
Dreiss, Fuhlendorf, Steimle & Becker  
Patentanwälte  
Postfach 10 37 62  
70032 Stuttgart (DE)

(72) Inventors:  
• Mori, Shinji, Tokai-Rika-Denki-Seisakusho K.K.  
Niwa-gun, Aichi-ken (JP)

### (54) Webbing retractor

(57) A webbing retractor which, by causing relative rotation between a prime mover rotating body (102) and a rotating disc (140), connects the prime mover rotating body (102) and a driven shaft (112) which is connected to a take-up shaft (20) of a webbing belt (28). A planet gear (72) is pivotally supported at a plate (68) having a braking piece (80) and meshes with a sun gear (62). The plate (68) is supported so as to be swingable around the sun gear (62). When the sun gear (62) is driven to rotate at greater than a predetermined speed, the planet gear (72) begins to circle around the sun gear (62) against urging force of a spring (78) attached to the plate (68), and makes the plate (68) rotate such that the braking piece (80) slidingly contacts the friction ring (170). Due to this braking, the rotating disc (140) connected to the friction ring (170) rotates relative to the prime mover rotating body (102).



EP 1 382 498 A3



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 03 01 5524

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 201 15 316 U (TRW REPA GMBH) 7 February 2002 (2002-02-07)	1-6, 8, 12	B60R22/46
Y	* the whole document *	16, 17	
X	US 4 423 846 A (FOEHL ARTUR) 3 January 1984 (1984-01-03) * column 7, line 53 - column 8, line 37; figures 14E, 14F, 14G, 14H *	1, 2, 5, 7, 8	
X	GB 2 354 742 A (TAKATA CORP) 4 April 2001 (2001-04-04)	1, 10, 11	
Y	* page 15, line 8 - page 35, line 25; figures 1-9 * * page 44, last line - page 45, line 18; figures 17-20 *	15	
Y	EP 1 195 536 A (TOYOTA JIDOSHO KK) 10 April 2002 (2002-04-10) * column 2, line 43 - column 15, line 46; figures *	15	TECHNICAL FIELDS SEARCHED (Int.Cl.7)  B60R
Y	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 08, 6 October 2000 (2000-10-06) -& JP 2000 142321 A (FUJITSU TEN LTD), 23 May 2000 (2000-05-23) * abstract; figures *	16, 17	
The present search report has been drawn up for all claims			
Place of search <b>BERLIN</b>		Date of completion of the search <b>6 January 2004</b>	Examiner <b>David, P</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04001)



European Patent  
Office

Application Number  
EP 03 01 5524

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



European Patent  
Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number

EP 03 01 5524

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-6, 8, 12

DE 201 15 316 U (referred to as D1 in the following) discloses (see annex) the subject matter of claims 1, 2, 5, 6, 8 and 12.

D1

The additional features of claim 3 are not disclosed by and therefore can be seen to make the following contribution over the prior art (Special Technical Features (STF), (Rule 30 EPC)): the urging member has one end and another end and is elastically deformable, and the one end is attached to the prime mover rotating body, and the other end is held at the rotating member so as to be able to push the rotating member.

D1

The additional features of claim 4 are not disclosed by and therefore can be seen to make the following contribution over the prior art (Special Technical Features (STF), (Rule 30 EPC)): the urging member has a coil spring.

The problem corresponding to these special technical features can be seen as how to find an alternative to the urging member of D1.

2. Claim : 7

The additional features of claim 7 are not disclosed by D1 and therefore can be seen to make the following contribution over the prior art (Special Technical Features (STF), (Rule 30 EPC)): the connecting members are roller-shaped, and due to the relative rotation, the connecting members are pressed by the peripheral surface of the driven shaft and connect the prime mover rotating body and the driven shaft, and rotation of the prime mover rotating body is thereby transmitted to the driven shaft.

The problem corresponding to these special technical features can be seen as how to find an alternative to the connecting members of D1.

3. Claims: 9, 10, 11, 13, 14

The additional features of the following claims are not disclosed by D1 and therefore can be seen to make the following contribution over the prior art (Special Technical Features (STF), (Rule 30 EPC)):

9: the braking mechanism brakes the rotating member when



European Patent  
Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number

EP 03 01 5524

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

the prime mover rotating body is driven to rotate at greater than a predetermined speed.

10: the braking mechanism connects the driving mechanism such that motion of the braking mechanism for braking can be transmitted from the driving mechanism.

11: the braking mechanism brakes the rotating member interlockingly with driving rotation of the prime mover rotating body by the driving mechanism.

13: the friction member is substantially ring shaped, and the braking member is substantially shaped as a ring having one end and another end, and the braking member is disposed so as to surround one portion of an outer peripheral surface of the friction member, and in a state in which the one end of the braking member is held at the outer peripheral surface of the friction member, the other end of the braking member is connected to the driving mechanism and is pulled in a direction of decreasing a diameter of the braking member when the driving mechanism operates.

14: the webbing retractor further comprising a frame which is fixed, and the friction member is substantially ring shaped, and the braking member is substantially shaped as a ring having one end and another end, and the braking member is disposed so as to surround one portion of an outer peripheral surface of the friction member, and in a state in which the one end of the braking member is held at the outer peripheral surface of the friction member, the other end of the braking member is anchored at the frame so as to be pulled in a direction of decreasing a diameter of the braking member when the friction member is rotated.

The problem corresponding to these special technical features can be seen as how to find an alternative to the braking mechanism of D1.

4. Claim : 15

D1 discloses also a webbing retractor according to claim 1 (see annex) wherein the prime mover rotating body 24 has an external gear which is ring shaped and has external teeth for connection to the driving mechanism 44, 46 such that the external gear can be driven and rotated; a base portion having a holding portion 25 for holding the plurality of connecting members 26 from which the subject matter of claim 15 differs in that (Special Technical Features (STF), (Rule 30 EPC)) the base portion is pivotally supported coaxially with the rotating member; and at least one torque limiter provided between the external gear and the base portion, so as to be able to transmit torque in a predetermined range to the base portion from the external gear.



European Patent  
Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
EP 03 01 5524

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

The problem corresponding to these special technical features can be seen as how to limit the force transmitted to the vehicle occupant by the webbing retractor.

5. Claim : 16

D1 discloses also a webbing retractor according to claim 1 (see annex) that further comprises a control unit for controlling operation of the driving mechanism wherein the control unit effects control so as to cause the driving mechanism to operate in case of an emergency braking (see page 1, lines 9-18), from which the subject matter of claim 16 differs in that (Special Technical Features (STF), (Rule 30 EPC)) the control unit effects control so as to cause the driving mechanism to operate when a rate of change in deceleration at a time when the vehicle decelerates is greater than or equal to a predetermined value.

The problem corresponding to these special technical features can be seen as how to define the braking force that starts the pre-tensioning of the belt.

6. Claim : 17

D1 discloses also a webbing retractor according to claim 1 (see annex) that further comprises a control unit for controlling operation of the driving mechanism wherein the control unit effects control so as to cause the driving mechanism to operate in case of an imminent crash (see page 1, lines 9-18), from which the subject matter of claim 16 differs in that (Special Technical Features (STF), (Rule 30 EPC)) the control unit effects control so as to cause the driving mechanism to operate when a distance to an obstacle which is positioned ahead of the vehicle is less than a predetermined value.

The problem corresponding to these special technical features can be seen as how to define the imminence of the crash that starts the pre-tensioning of the belt.

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 01 5524

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-01-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 20115316	U	07-02-2002	DE 20115316 U1	07-02-2002
			EP 1293402 A2	19-03-2003
			US 2003052209 A1	20-03-2003
US 4423846	A	03-01-1984	DE 3131637 A1	27-01-1983
			AU 548979 B2	09-01-1986
			AU 7607281 A	22-04-1982
			DE 3153320 C2	21-01-1988
			FR 2491340 A1	09-04-1982
			JP 1309849 A	14-12-1989
			JP 1638751 C	31-01-1992
			JP 3004406 B	23-01-1991
			JP 1309850 A	14-12-1989
			JP 1638752 C	31-01-1992
			JP 3004407 B	23-01-1991
			JP 1309851 A	14-12-1989
			JP 1687477 C	11-08-1992
			JP 2010743 B	09-03-1990
			JP 57128169 A	09-08-1982
			SE 450362 B	22-06-1987
			SE 8105823 A	07-04-1982
			SE 8602813 A	25-06-1986
			SE 464015 B	25-02-1991
			SE 8602814 A	25-06-1986
			SE 464072 B	04-03-1991
			SE 8602815 A	25-06-1986
GB 2354742	A	04-04-2001	DE 10038388 A1	15-02-2001
			DE 20013541 U1	19-10-2000
			GB 2383981 A ,B	16-07-2003
			JP 2002104135 A	10-04-2002
			US 6499554 B1	31-12-2002
			US 2002189880 A1	19-12-2002
EP 1195536	A	10-04-2002	JP 2001343024 A	14-12-2001
			BR 0106269 A	26-03-2002
			EP 1195536 A1	10-04-2002
			BR 0106268 A	02-04-2002
			BR 0106270 A	26-03-2002
			CN 1372622 T	02-10-2002
			CN 1372623 T	02-10-2002
			CN 1372624 T	02-10-2002
			EP 1197672 A1	17-04-2002
			EP 1207316 A1	22-05-2002
			WO 0173307 A1	04-10-2001
			WO 0173308 A1	04-10-2001

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 01 5524

This annex lists the patent family members relating to the patent document(s) cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file or.  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-01-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1195536 A		WO 0173309 A1	04-10-2001
		JP 2001343025 A	14-12-2001
		JP 2001343026 A	14-12-2001
		US 2002165053 A1	07-11-2002
		US 2002162720 A1	07-11-2002
		US 2003106763 A1	12-06-2003
JP 2000142321 A	23-05-2000	NONE	

EP FORM P/459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82